Abstract

Causality, though highly intuitive, today is a hot research area in physical sciences. There are many attempts to explain physical systems via the lens of causality as it enables the scholars to represent a complex structure using simpler causal model and inherent causal structures. The physics that acts between the various variables in the model is represented using the causalstatistical parameters. Here in this dissertation, we see two applications of causality in quantum systems. First, we try to establish that the causal discovery algorithms are principle tool of causal theory. These Causal Discovery algorithms cannot do justification with the Bell systems i.e. here we try to produce the result that the Causal explanation of the Bell systems cannot distinguish between the systems that satisfy Bell Inequality from the systems that violate it. Second, we try to explain causally the reason as to why the single qubit system in a single qubit mixed state environment cannot be wholly simulated. It is an established result that such physical systems simulate a fraction of volume of all quantum channels, 3 8 volume of the tetrahedron that represent all possible quantum channels of a single qubit system. Our attempt is to derive a casual model representing such system and the constraints contained in it.